NOTES ON RARE U. S. PLANTS FROM ARIZONA, I: INCLUDING A *TALINUM* (PORTULACACEAE) NEW TO THE U.S.

L. J. Toolin, Herbarium, University of Arizona, Tucson, 85721

A number of the rarer plants in the U.S. flora are to be found only in extreme southeastern Arizona. Most of these are Mexican peripherals - species centered in Mexico that have limited distributions north of the International Boundary. Of some 60 such species in Arizona, 41 occur nowhere else in the U.S. In addition, at least 23 endemics are native to the southeastern corner of the state. While most of the peripheral and endemic species have been on record for many years, little or no information on their numbers, local distributions, habitats, or population trends has been published. This paper is the first in a series intended to provide some such basic information.

The area covered in this series (see Fig. 1) includes Cochise, Santa Cruz, southern Graham and Pinal counties, and eastern Pima County. Southeastern Arizona has long been known for the diverse and interesting biota that it supports, deriving from the region's geographical location, its strikingly varied topography, climate, and the resulting diversity of habitats. Our area shares portions of three Biotic Provinces: Sonoran, Chihuahuan, and Madrean. Descriptions of the physical and biotic features of the region are available elsewhere (Lowe, 1964; Brown & Lowe, 1978 (map); Brown et al., 1982). Certain localities within the larger area considered here harbor concentrations of diversity, including rare forms. Typically, these localities are associated with mountainous terrain, especially where riparian canyon habitats are present, as at Sycamore Canyon in the Pajarito Mts. (Toolin et al., 1979).

In the following discussions, all specimens cited are deposited at ARIZ, unless otherwise noted. I thank R. W. Kiger for identifying the *Talinum*, C. Russel for providing label information from *Talinum* specimens at US, and C. Sternberg for the map.

PORTULACACEAE

Talinum marginatum Greene (1912)

A low, herbaceous perennial previously known from a few scattered collections in Mexico. The first U. S. specimen came from Ramsey Canyon, Huachuca Mts., Cochise Co., 20 July 1980, *L. J. Toolin* 920 (ARIZ & US). The type was collected at Santa Teresa, near Tepic, Nayarit, Mexico, by J. N. Rose in 1897. Other collections known to me, but not seen, are from northwestern Chihuahua, near Colonia Garcia, *Townsend & Barber* 151, in 1899 (US); at an unspecified locality of the Sierra Madre, Chihuahua, *E. W. Nelson* 6094, also in 1899 (US).

Figure 1: United States localities for species discussed

This species appears to be rather specialized, growing only in open patches of thin gravel soil that are devoid of other perennial plants. The Ramsey Canyon population consists of about 250 individuals growing in pine-oak woodland at 1800 m elevation, in association with such annuals as Dalea filiformis, Crotalaria sagittalis, and Ipomoea costellata. A second population of the same size occupies similar habitat in adjacent Carr Canyon, at 2300 m. elevation. Both populations have maintained roughly the same numbers over the last six years.

T. marginatum has, as now known, a very wide and disjunct distribution. Its range covers 1000 km along the Sierra Madre Occidental. The climates under which this species grows vary dramatically: the Tepic region is tropical and completely frost-free, while the Huachuca Mts. undergo long periods of freezing weather during the winter.

The paucity of records for T. marginatum suggests that it may be truly rare and widely disjunct, for although it is a small plant (to 8 cm tall), its bright yellow flowers stand out in the bare situations in which it grows. Whether this is a true picture of the species' distribution will, it is hoped, be determined by future collection and a recently-initiated search of Mexican herbaria. I have found that these plants usually produce some cleistogamous flowers with viable seed. The ability to self-fertilize explains, in part, the establishment and persistence of populations in widely scattered localities.

Published descriptions (Greene 1912; Wilson 1932), based solely on pressed specimens, are largely inaccurate and lack some details. T. marginatum is acaulescent, the leaves and inflorescence arising from the apex of the tuberous roots, which vary in shape from nearly globose to fusiform. The leaves have been described as much flattened, oblong-spatulate, obtuse, with blades 1-2 cm long. The inflorescence is said to be shorter than the leaves. In fact the leaves are terete, 1.5-2.5 mm in diameter, more-or-less linear, with blades up to 6 cm long. The inflorescence commonly equals or exceeds the leaves. The petals are mostly 2.5-3.5 mm long. This species can be distinguished from other Arizona Talinums by its combination of yellow flowers in a cymose inflorescence.

Specimens examined: Arizona, Cochise Co., Huachuca Mts., ridge at west side of Ramsey Canyon, Toolin 920 & 1447; Huachuca Mts., Carr Canyon, near the Reef, F. Reichenbacher 1091. Mexico, Sonora, Sierra Charuco, in gravel atop boulder, H. S. Gentry 2303.

LEGUMINOSAE

Dalea tentaculoides H. S. Gentry (1950).

A shrub endemic to Santa Cruz and Pima counties, known from Sycamore Canyon, Pajarito Mts., Santa Cruz Co. (the type locality), and the Baboquivari Mts., (including the adjacent Quinlan and Coyote Mts.). This species appears to have lost ground in the Baboquivaries. Several collections were made from canyons on the west slope of the range in the 1920's and 1930's, but a 1981 survey of those localities failed to locate a single specimen. Since the west slope habitats have been strongly modified by livestock grazing, the populations may have been exterminated within the last fifty years. D. tentaculoides still occurs in the Baboquivari Mts. region, at least on Kitt Peak (Quinlan Mts.), where several were seen in 1984 at 1450 m elevation (G. Starr, pers. comm.), and in Mendoza Canyon (Coyote Mts.). The shrub almost certainly grows elsewhere in the northern end of the Baboquivaris, but its distribution and numbers there are still poorly known. In Sycamore Canyon, Pajarito Mts., about 100 individuals grow in partial shade under oaks, cottonwoods, ash, and sycamores at elevations of 1125 - 1215 m. The population is distributed as scattered colonies and individuals over a two-mile stretch of the main canyon, and in a few side drainages. Plants bloom twice a year, in spring and in fall.

No seedlings were found from 1980 to 1983, but a number have been produced since then. Seedling establishment may be dependent on summer rainfall, since the several summers preceeding 1983 were drier than normal, while winter rainfall was average. Observations on age distribution in colonies suggest that seedling production and establishment are dependent on particularly favorable conditions of erratic occurrence. In one example, five fully mature specimens with strongly woody stems are clustered with 20 smaller, younger, mostly suffrutescent plants. The younger individuals are essentially identical in height, main stem diameter, and branching. They seem to have germinated and become established at the same time. The lack of intermediates between the two age/size groups in the cluster indicates that additions to the population are episodic.

Both Gentry (1950) and Barneby (1977) note that D. tentaculoides has no close relatives. This, along with its present limited range, implies that it is an old, relictual species.

Specimens Examined: Santa Cruz Co., Pajarito Mts., Sycamore Canyon: R. Darrow, s.n., May 1941 (Holotype, ARIZ); J. M. Kaiser 1275; Toolin 1389; L. Benson 10960; L. N. Goodding, s.n., May 1938. Pima Co., Baboquivari Mts., Baboquivari Canyon: Loomis & Peebles 1597; Peebles & Harrison 3965; Kearney & Peebles 8543. Quinlan Mts., Kitt Peak: G. Starr 762. Coyote Mts., Mendoza Canyon: W. E. Niles 497.

Marina diffusa (Moric.) Barneby (1977).
Dalea diffusa Moric.

A peripheral Mexican shrub distributed from Sonora south to Guatemala. Type from "Nova Hispania" (Mexico), collected by M. Pavon in 1827. First collected in the U.S. in the Patagonia Mts., Santa Cruz Co., in 1934, Kearney & Peebles 10054. In the U.S., this species has a very limited range, and has not been known to number more than about 25 adults at one time. The population is confined to a south-facing rocky slope, in fine gravel soil derived from decomposing granite, at 1680 m elevation. Although this shrub is short-lived here, at its northernmost locality, reproduction seems adequate to maintain and even increase population numbers. Each adult produces a few seedlings in most years. Observation has shown that population growth in this frost-sensitive plant is limited by episodes of abnormally cold weather, as in 1978, when all individuals were killed by a hard freeze. The population is carried through these disasters by its reserve of seeds, which may remain viable for several years.

Barneby (1977), describing the species as known in Mexico, states that individuals develop persistent woody stems after several years' growth, and that these give rise to secondary suffrutescent stems during the growing season. Individuals in the Patagonia Mts. rarely live long enough to develop woody stems. Typically, these plants produce short-lived suffrutescent stems each year from a more-or-less woody caudex. Plants seen as lush, vigorous shrubs in the fall are found in the following spring with the above-ground growth reduced to a tangle of dead branches. Brown (1984) pointed out that for a given species (animal or plant), suitable local sites will decrease in number towards the margin of a species range, and that such localities will be increasingly unfavorable. The Patagonia Mts. M. diffusa population seems to be living at the very edge of its ecological limits. Barneby (1977) mentions that this species tends to form colonies, and our M. diffusa largely follow that pattern. Clusters of eight or so individuals are scattered over a few hectares. Persistence of these colonies is dependent on climatic conditions, and they come and go rather rapidly.

M. diffusa shares its Patagonia Mts. habitat with Dalea pulchra, Mimosa biuncifera, Brickellia coulteri, Yucca schottii, scattered Quercus emoryi, and variety of grasses. The nearest Mexican populations are about 250 km to the south, in northeastern Sonora and northwestern Chihuahua.

Specimens examined: Arizona, Santa Cruz Co., Patagonia Mts., Sycamore Canyon, Kearney & Peebles 10054; J. M. Kaiser, s.n., Oct. 1967; Toolin & Starr 2166. Mexico, Sonora, Rio de Bavispe, S. S. White 3707 3948; Sierra Chuna, H. S. Gentry 1369; Chihuahua, Rio Bonito, H. LeSeuer 1216.

LITERATURE CITED

Barneby, R. C., 1977 - Dalea Imagines. Mem. N. Y. Bot. Gard. 27:126

Brown, D. E. (ed.) 1982 - Biotic communities of the American Southwest - United States and Mexico. Desert Plants 4.

Brown, D. E. & C H. Lowe 1978 - Biotic Communities of the Southwest (map). For. Serv. Gen. Tech. Bull. RM41. Ft. Collins.

Brown, James H., 1984 - On the relationship between abundance and distribution of species. Am. Nat. 124:266.

Gentry, H. S., 1950 - Studies in the Genus Dalea. Madrono 10:240.

Greene, E. L. 1912 - Leaflets of Bot. Obs. & Crit. 2:270

Lowe, C. H. 1964 - Arizona's natural environment. U. A. Press, Tucson

Toolin, L. J., et al. 1979 - The flora of Sycamore Canyon, Pajarito Mountains, Santa Cruz Co., Arizona. J. Az.-Nev. Acad. Sci. 14:66.

White, S. S. 1948 - The vegetation and flora of the region of the Rio Bavispe in northeastern Sonora, Mexico. Lloydia 11:229.

Wilson, P. 1932 - Talinum. No. Am. Flora 21(4):285.